N ECONOMIC ANALYSIS OF RED MEAT, FISH, POULTRY AND WILD GAME CONSUMPTION PATTERNS IN ANCHORAGE, ALASKA

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SUMMARY

This report identified and analyzed various socio-economic factors which influenced the purchase of red meat, fish and poultry in Anchorage, Alaska. Consumption of wild game was also considered. Of interest was estimation of the extent to which wild game was substituted for domestic red meat, fish and poultry.

The raw data used in this research were obtained from a household survey carried out during autumn of 1971. After completion of the survey the initial consideration was a presentation of household and market characteristics of the sample. With regard to studying the relationship between socio-economic variables and consumption variables, two patterns of analysis were attempted. First, the data were put in tabular form for ease of presentation so that individual factor relationships could be identified. Second, multiple regression analysis was used to simultaneously investigate relationships between variables. In the final section of this research, using information from this household survey, the potential impact of Alaska meat products on the Anchorage market was discussed.

The following is a summary of the findings:

1. The average household expenditure in Anchorage for red meat, fish and poultry was estimated at $13.83 per week. Sixty-eight percent of the sample ranged from $5.33 to $22.33. Annual per capita red meat consumption for Anchorage was estimated at 164.5 pounds. Wild game consumption was 17.6 pounds per capita, annually.

2. Wide variation in household expenditure patterns for red meat, fish and poultry in Anchorage was identified in this research. This variation was significantly influenced by household size, education, income, wild game consumption and number of trips to the food store per week.

3. As household size increased, household expenditures for red meat, fish and poultry also increased. On a per capita basis, however, expenditure levels declined as household size increased.

4. Military households had lower meat expenditure levels and wild game consumption, compared with most civilian households. Commissary buying privileges and short-term residency were probable causes.

5. Weekly household pork, fish or poultry consumption was not significantly influenced by household income.

6. Wild game consumption negatively influenced consumption of beef. A positive relationship existed between wild game and fish consumption.

7. A positive consumer response was indicated for Alaska-produced beef products. Market potential was identified for young beef as well as manufactured beef.

8. Pork industry expansion in Alaska seemed more limited than beef industry expansion. Per capita consumption of beef in Anchorage was estimated to be over twice the per capita consumption of pork. Local production currently contributed little to the retail market for beef or pork in Alaska.

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AN ECONOMIC ANALYSIS OF RED MEAT, FISH, POULTRY AND WILD GAME CONSUMPTION PATTERNS IN ANCHORAGE, ALASKA

W.C. Thomas, C.F. Marsh, and C.A. Stephens

INTRODUCTION

Information on consumption patterns presented herein should give some insight into factors affecting meat purchases in urban Alaska. The selection of Anchorage as the site for this research was based on a desire to have additional market information for an area that contains nearly one-half the people of Alaska.

The following is one part of a research program that is designed to supply information on red meat consumption, marketing and production patterns to Alaskan livestock producers, food retailers and wholesalers. The purpose of this phase of the research is to analyze consumption and expenditures at the retail level for commercial red meat, fish and poultry. Later research will investigate the structure of wholesale-retail commercial red meat sales in Alaska. Lastly, the economics of producing and marketing livestock at the local level in Alaska will be studied.

Data for the investigation of consumption patterns in Anchorage households were obtained through household questionnaires. Information was gathered by personal interview concerning red meat, fish and poultry consumption, and also method of purchase, attitudes toward meat, and selected demographic characteristics.

Wild game consumption also was surveyed. Alaska is probably unique among the 50 states in the abundance of wild game. Therefore, the substitution aspects of game meat for red meat, fish and poultry were of major interest.

OBJECTIVES

1. To analyze household consumption characteristics for red meat, fish, poultry and wild game in Anchorage, Alaska.

2. To investigate the impact of selected socio-economic characteristics on consumption of red meat, fish, poultry and wild game.

3. To study the potential impact on the Anchorage market of Alaska-produced red meat and poultry products.

PROCEDURE

Individual household interviews were the source of data for delineation of the Anchorage retail meat market. The random sample was limited to 400 households because of cost constraints on the research. It is reasonable to expect that population characteristics can be extrapolated from this sample.

To obtain the sample, an alphabetical list of households in the Anchorage area was first numbered from 1 to 21,282.[1] Using a table of random numbers, a sample of household units by address was drawn. A personal interview was attempted for each selected household. If no one in the household was home at the time of the initial contact, two repeated attempts at contact were made when possible. If no contact was achieved, that household was removed from the sample thereby requiring selection of an alternate household. In all, 402 households were surveyed and included in the following analysis. The major emphasis of the questionnaire concerned the purchase and-or consumption of red meat, fish, poultry and wild game for seven days previous to the household personal interview. A major limitation of this research was that interviews were conducted in only one period of the year; interviewing began on October 5, 1971 and terminated on December 10, 1971. Thus, seasonal trends in meat consumption throughout the year were not investigated.

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[1] The Anchorage area was determined to have 21,282 households in 1970, excluding military bases.

HOUSEHOLD AND MARKET DEFINITION

Weekly red meat, fish and poultry expenditures averaged $13.83 per household for the survey (Table 1).[2] The standard deviation indicates that meat expenditures of 68 percent of the sample ranged between $22.33 and $5.33 per household, reflecting a wide variation among households in average weekly meat expenditures. Socio-economic characteristics of the selected households will be evaluated in the next section of this paper in an attempt to elucidate reasons for the wide range in household expenditure levels.

Table 1. Means and Standard Deviations for Selected Household Characteristics, Anchorage, Alaska 1971

	Unit	Mean Per Household	Standard Deviation
Meat expenditures	dollars	13.83	8.5
Household income	dollars	15,000.00	6,876.4
Household size	members	3.5	1.7
Husband's age	years	38.2	12.5
Wife's age	years	36.4	12.7
Husband's education	years	13.1	2.5
Wife's education	years	12.6	2.1
Time in Alaska	years	12.3	11.3
Time in Anchorage	years	9.7	9.1
Annual wild game consumption	pounds	61.8	163.4

Mean household income and household size were $15,000 and 3.5 members respectively. This, coupled with average husband's age of 38 years, and wife's age of 36 years, indicates middle income households past the normal peak childbearing years. The Anchorage population tended to be well educated, as the average level for both husband and wife included some college education.[3] [4]

Another factor expected to influence red meat, fish and poultry consumption in Alaska was the amount of wild game consumed. Annual wild game consumption was approximately 62 pounds per household.[5] Moose was consumed by 11 percent of the households during the seven days prior to the interview (Table 2). Further investigation of wild game consumption patterns will be presented later in this paper.

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[2] These are meat expenditures for the seven days previous to the personal interview. The term "meat expenditure" is used interchangeably with "red meat, fish and poultry expenditure" throughout this study.

[3] Any amount of education beyond 12 years was recorded as some type of college training.

[4] Additional information on household characteristics of the sample can be found in Appendix A.

[5] Annual data were obtainable for wild game because the consumer was generally able to determine how much game was obtained from hunting trips during the previous year, and how much presently remained in his food freezer.

Table 2 shows average weekly household consumption of various types of red meats, fish, poultry and wild game. Ground beef was consumed by the largest number of households (79 percent). Bacon, beefsteak and poultry also were used in well over 60 percent of the households sampled. We shall return to these statistics in the section disussing the potential for Alaskan production of red meats and poultry.

Table 2.
Average Weekly Usage of Selected Types of Red Meat, Fish, Poultry and Wild Game by All and User Households

Meat Product	Average Weekly Consumption by All Households	Average Weekly Consumption by User Households	Number of User Households
	pounds	pounds	% of total
Beefsteak	2.22	3.36	66
Beef roast	1.77	4.06	44
Ground beef	2.07	2.61	79
Pork chops	0.84	2.26	37
Pork roast	0.24	3.92	6
Bacon	1.01	1.52	66
Pork sausage	0.33	1.45	22
Ham	0.87	3.12	28
Lamb chops	0.03	1.83	1
Fish or seafood	1.01	1.94	52
Poultry	2.51	3.86	65
Luncheon meats	0.67	1.37	49
Moose	0.47	4.20	11
Caribou	0.25	4.08	6

A question on the consumption of commercially produced reindeer meat was included in the survey to obtain information on the acceptance level of this product in Anchorage households. During the seven days previous to the personal interview, only 1 out of the 402 households consumed reindeer meat. Table 3 indicates that although nearly 50 percent of the sampled households had tried reindeer during any past period, only about one-third had eaten reindeer meat during 1971. Average annual household reindeer consumption for this survey was determined to be 4.1 pounds.

Table 3. Household Purchases of Reindeer Meat

Response	Ever Purchased %	Purchased Any in Last Year %
Yes	48	36
No	52	64

Annual per capita consumption data for Anchorage were estimated from the weekly data developed in this study. These estimates were compared with U.S. per capita consumption figures in Table 4. Beef consumption in Anchorage compared favorably with U.S. consumption for 1971. Consumption in Anchorage of pork, poultry and lamb was markedly below national levels. Fish and seafood consumption was higher in Anchorage relative to the total U.S. If wild game is added to total red meats consumed in Anchorage, the sum, 182.1 pounds, is similar to but slightly smaller than, the total U.S. average of 191.8 pounds.

Table 4.
Estimated Annual Per Capita Consumption of Red Meat, Fish, Poultry and Wild Game for Anchorage and the United States, 1971

Product	Annual Per Capita Consumption Anchorage (pounds)	Annual Per Capita Consumption U.S. (pounds)[b]
Beef and veal	109.9[a]	115.8
Pork	53.5[a]	72.9
Lamb and mutton	1.1[a]	3.2
Total red meats	164.5[a]	191.8
Fish and seafood	15.0[a]	11.2
Poultry	37.2[a]	50.1
Reindeer	1.2	—[c]
Wild game	17.6	—[c]

[a] Estimated by multiplying weekly per capita consumption data by 52.

[b] Source: See literature citation [8].

[c] U.S. data were not available for these two products.

INFLUENCE OF INDIVIDUAL SOCIO-ECONOMIC VARIABLES ON RED MEAT, FISH, POULTRY AND WILD GAME CONSUMPTION

Analysis of the relationship between individual socio-economic factors and consumption patterns was developed in tabular form. Interpretation of the data required identification of trends which were observed between selected variables.[6]

Income.

As household income increased, average weekly household meat expenditures tended to increase. Slight downtrends were noted, however, between intervals $6,000 through $11,999 and $18,000 through $23,999 (Table 5). The per capita data indicated that low income families had next to the highest level of per capita meat expenditures. Excluding the lowest income group, as income increased, an upward trend was noted in per capita meat expenditures. Differences, however, were small. Between the $24,000 and over level, and the $6,000 - $11,999 level, weekly per capita meat expenditure differed only $.35. This suggests that households consider meat a staple in the diet and that income changes have a limited effect on per capita expenditures.

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[6] Studies in Maryland [5] and Nevada [6], both involving analysis of socio-economic characteristics of meat consumption, are recommended for the interested reader.

Table 5.
Effect of Household Income on Total Red Meat, Fish and Poultry Expenditures and Total Annual Wild Game Consumption

Household Income	Number of Households	Average Weekly Household Meat Expenditures	Per Capita Weekly Meat Expenditures	Average Annual Household Game Consumption	Per Capita Annual Game Consumption
dollars	% of Total	dollars		pounds	
0- 5,999	10	10.99	4.56	23.8	9.0
6,000-11,999	21	10.31	4.27	30.7	10.4
12,000-17,999	24	15.31	4.48	80.8	19.8
18,000-23,999	18	15.11	4.56	87.5	23.4
24,000-over	14	17.67	4.62	89.1	21.3
Unknown	13	13.02	4.06	39.7	10.2

As income increased, annual wild game consumption[7] increased markedly on both a household and per capita basis. At the highest income level, per capita wild game consumption turned downward slightly. Table 24 in Appendix B presents relationships between household income and actual household consumption of other meat, fish and poultry products. The quantity of poultry consumed generally increased with income (a slight downturn occurred in interval $6,000 - $11,999). Pork and fish consumption exhibited minimal variation at different income intervals. Beef consumption was erratic.

Household size

Average weekly household meat expenditures increased continuously at each level of household size (Table 6). Per capita meat expenditures exhibited the opposite trend (a very small upturn was noted in 6 member households). As families increased in size, each individual member was generally less well-off relative to meat expenditures. Large but erratic increases were noted in household and per capita wild game consumption as household size increased from 1 to-7-and-over.

Table 6.
Effect of Household Size on Total Red Meat, Fish and Poultry Expenditures and Total Annual Wild Game Consumption

Household Size	Number of Households	Average Weekly Household Meat Expenditures	Per Capita Weekly Meat Expenditures	Average Annual Household Game Consumption	Per Capita Annual Game Consumption
	% of Total	dollars		pounds	
1	7	5.97	5.97	5.9	5.9
2	24	11.72	5.86	39.1	19.5
3	24	13.20	4.40	28.1	9.4
4	20	15.25	3.81	71.4	17.9
5	13	15.68	3.14	114.6	22.9
6	6	19.01	3.17	108.5	18.1
7-over	6	21.28	2.69	174.8	24.9

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[7] Annual wild game consumption data were obtained from the survey. This information was used, instead of weekly wild game consumption data, to reduce the influence of seasonal consumption variation.

Consumption of beef increased markedly with increased size of household. Larger households also tended to consume more pork, fish and poultry. However, downturns were noted at certain intervals for each of these latter commodities (Table 25 in Appendix B).

Occupation

Occupation of heads of households was associated with slightly different patterns in household meat expenditures and wild game consumption (See Table 7 for data presentation and worker category definition). Blue-collar workers (38 percent of the sample) had slightly higher household and per capita meat expenditures, while white-collar workers (39 percent of the sample) had slightly higher household and per capita wild game consumption.

Table 7.
Effect of Occupation of Head of Household on Total Red Meat, Fish and Poultry Expenditures and Total Annual Wild Game Consumption

Occupation	Number of Households	Average Weekly Household Meat Expenditures	Per Capita Weekly Meat Expenditures	Average Annual Household Game Consumption	Per Capita Annual Game Consumption
	% of Total	dollars		pounds	
White-collar[a]	39	13.75	4.49	72.6	20.1
Blue-collar[b]	38	15.47	4.62	70.0	16.5
Military	16	11.68	3.97	40.2	13.2
Other[c]	5	10.96	4.43	10.9	4.3
Unknown	2	8.27	2.75	0.0	0.0

[a] White-collar includes professional people, managers, clerical and sales workers.

[b] Blue-collar includes craftsmen, equipment operators, household and service workers and laborers.

[c] This category includes students, retired people and the unemployed.

Average household meat expenditures were lower for military[8] than for civilian households because meat prices in the commissary were lower than in civilian markets. Military people, who are generally short-term residents, consumed less wild game, both per household and per capita, than the white-and blue-collar groups.

The remaining occupation category, entitled "other," included students, retired people, and the unemployed. As might be expected, this group, which generally lacks the economic or institutional advantages of the three previously mentioned occupational categories, purchased red meats, fish and poultry at the lowest household expenditure level. On a per capita basis, however, the student, retired, and unemployed category spent slightly less than the white-and-blue collar workers and more than the military group. This reflected a generally smaller household size for this group (Table 23 in Appendix A). The "other" category also had the lowest consumption of wild game, both per household and per capita.

Blue-collar households consumed the largest quantities of beef and poultry (Table 26 in Appendix B). Pork consumption was the largest in blue-collar and military households. Fish consumption was relatively similar for all occupational groups.

Meat expenditures for military were

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[8] These are households with the head of household in the military service, but not living on any military base.

lower than for white-collar families, while actual consumption of beef was similar and pork slightly greater. This adds credence to the hypothesis that commissary buying increased the standard of living of military people.

Education

A striking feature of education levels is that only 1 percent of husbands or wives had 6 or less years of education (Table 8 and 9). Anchorage seems to have a well educated citizenry.

Table 8.
Effect of Husband's Education[a] on Total Red Meat, Fish and Poultry Expenditures and Total Annual Wild Game Consumption

Husband's Education	Number of Households	Average Weekly Household Meat Expenditures	Per Capita Weekly Meat Expenditures	Average Annual Household Game Consumption	Per Capita Annual Game Consumption
years	% of Total	dollars		pounds	
1-6	1	15.36	4.46	6.7	1.7
7-12	49	15.27	4.61	82.3	20.3
13-16	33	13.81	4.10	53.6	16.6
Over 16	5	12.74	2.79	66.2	11.3
Unknown	13	10.06	5.13	6.4	3.9

[a] Includes households headed by a single male adult.

Table 9.
Effect of Wife's Education[a] on Total Red Meat, Fish and Poultry Expenditures and Total Annual Wild Game Consumption

Wife's Education	Number of Households	Average Weekly Household Meat Expenditures	Per Capita Weekly Meat Expenditures	Average Annual Household Game Consumption	Per Capita Annual Game Consumption
years	% of Total	dollars		pounds	
1-6	1	12.46	3.33	40.0	10.6
7-12	57	14.70	4.48	76.1	18.9
13-16	35	13.08	4.16	41.7	12.8
Over 16	2	7.83	3.25	112.5	29.7
Unknown	5	11.85	6.24	21.5	7.9

[a] Includes households headed by a single female adult.

Meat expenditures, both per household and per capita, continuously declined as education for either husband or wife increased beyond high school. This may reflect a greater concern with diet, possibly associated with more sedentary employment by highly educated adults.

Annual wild game consumption (both per household and per capita) was at maximum when the husband's education level was between 7 and 12 years. Average annual household consumption of wild game tended to decline after 12 years of education (with a slight upturn for over 16 years). Per capita wild game consumption followed a similar pattern (excluding the upturn). Wives educated beyond the baccalaureate were in households with the largest per household and per capita annual wild game consumption.

Household beef consumption was highest when the education of either husband or wife was from the seventh year through high school (Tables 27 and 28 in Appendix B). Household beef consumption was less for 13-plus years of education for either husband or wife when compared with the 7-12 year education level for each group.

Pork consumption exhibited a surprising and steady decline, from a high of seven pounds when husband's education ended at grade school, to 2.2 pounds at post college levels. Pork consumption, as related to wife's education, continuously declined after 12 years of school.

Fish consumption for either husband or wife was relatively constant throughout the educational strata. Poultry consumption, as influenced by greater husband's education, first increased, then decreased in an erratic manner. As wife's education increased poultry consumption declined for each interval.

Age

As the husband's age increased, household meat expenditures increased, to the 60th year (Table 10). This may reflect increased earning power and increased family size over the productive life of the husband. The largest household and per capita meat expenditures occurred when the husband was in his fifties.

Table 10.
Effect of Husband's Age on Total Red Meat, Fish and Poultry Expenditures and Total Annual Wild Game Consumption

Husband's Age	Number of Households	Average Weekly Household Meat Expenditures	Per Capita Weekly Meat Expenditures	Average Annual Household Game Consumption	Per Capita Annual Game Consumption
years	% of Total	dollars		pounds	
19-under	1	9.28	3.02	0.0	0.0
20-29	26	12.05	4.22	27.9	9.6
30-39	24	15.13	3.68	106.5	25.6
40-49	15	16.53	4.17	107.6	20.0
50-59	15	17.44	5.85	58.2	22.0
60-over	5	10.58	4.83	28.4	9.5
Unknown	14	9.53	4.75	16.8	6.5

Annual household game consumption was highest when the husband was in the thirties and the forties. Household consumption dropped off dramatically in the 50-59 age bracket, but per capita consumption remained high. Per capita annual game consumption figures for ages below 30 and 60-and-over were the lowest of any groups.

Average household meat expenditure increased with wife's age until the fifties (Table 11). Per capita meat expenditures were lowest in the 30-39 age group. Household wild game consumption reached its high point in the 30-39 age bracket. Per capita consumption of wild game was at its lowest level for the 60-and-over age group.

Actual household consumption of meat, fish and poultry, associated with husband's age and wife's age, are given in Appendix B Tables 29 and 30, respectively. These data were somewhat erratic in nature.

Table 11.
Effect of Wife's Age on Total Red Meat, Fish and Poultry Expenditures and Total Annual Wild Game Consumption

Wife's Age	Number of Households	Average Weekly Household Meat Expenditures	Per Capita Weekly Meat Expenditures	Average Annual Household Game Consumption	Per Capita Annual Game Consumption
years	% of Total	dollars		pounds	
19-under	5	9.08	3.71	40.7	17.6
20-29	27	13.02	4.14	38.1	12.7
30-39	24	15.02	3.52	104.1	21.5
40-49	20	16.88	4.98	80.1	17.5
50-59	12	12.58	5.34	47.4	21.4
60-over	5	10.88	5.03	23.5	9.0
Unknown	7	11.64	5.67	16.9	4.8

Years in Alaska

Table 12 shows that of 402 households surveyed, 72 percent had lived in Alaska for 4 or more years. At least, the notion that Alaskan residents tend to be transient can be questioned. Furthermore household meat expenditures were the highest after the family had been in Alaska 4 or more years. The stability of the Alaskan household is reflected positively in red meat, fish and poultry expenditures.

Table 12.
Effect of Years Living in Alaska by Head of Household on Total Red Meat, Fish and Poultry Expenditures and Total Annual Wild Game Consumption

Number of Years in Alaska	Number of Households	Average Weekly Household Meat Expenditures	Per Capita Weekly Meat Expenditures	Average Annual Household Game Consumption	Per Capita Annual Game Consumption
	% of Total	dollars		pounds	
0—1	17	11.94	4.37	31.5	8.7
2—3	11	10.67	4.09	39.0	11.3
4—5	12	16.65	4.55	91.5	24.5
6 and over	60	14.41	4.47	68.8	17.9

Wild game consumption on a household and per capita basis, also was highest after the fourth year. Alaska has abundant opportunity for hunting and, as length of residence increases, proficiency at hunting would be expected to improve.

Families living in Alaska for 4 or more years had higher consumption of beef than families living in the state for less time. The peak consumption for beef was observed in the years 4 to 5. Poultry consumption increased slightly as time in state increased. Pork and fish consumption tended to be little influenced by length of residency (see Table 31 in Appendix B).

Number of Trips to Food Store Per Week

Nearly 60 percent of all households in the survey purchased food items once or twice a week (Table 13). The bulk of the remaining households (36 percent) went to the food store 3 or more times in a week. As number of visits to food stores increased, household meat expenditures also tended

Table 13.
Effect of Number of Trips to Food Store per Week on Total Red Meat, Fish and Poultry Expenditures and Total Annual Wild Game Consumption

Number of Trips to Store Per Week	Number of Households	Average Weekly Household Meat Expenditures	Per Capita Weekly Meat Expenditures	Average Annual Household Game Consumption	Per Capita Annual Game Consumption
	% of Total	dollars		pounds	
0[a]	5	12.00	3.79	78.2	18.8
1	30	11.64	4.14	47.4	13.3
2	29	13.30	4.36	88.1	23.2
3	18	16.41	4.67	49.5	13.2
4-over	18	16.36	4.94	51.1	13.1

[a] Household purchased meat, fish and poultry products from a food store less often than once per week.

to increase (there were slight downturns at 1 and 4-and-over visits). Per capita household meat expenditures exhibited a relatively small but continuous upward trend as number of trips increased.

Regarding household consumption of wild game, an unusual trend was noted. Consumption was relatively large (78.2 pounds) for less than 1 trip to the store per week. Consumption fell to nearly one-half the previous level with 1 trip to the store (47.4 pounds), then nearly doubled with 2 trips (88.1 pounds). For 3 trips and over, wild game consumption declined markedly again (approaching 50 pounds). Per capita annual game consumption exhibited a similar pattern.

Information on actual quantities consumed during the week (Table 32 in Appendix B) indicated that fish and pork consumption was only minimally influenced by number of trips to the store. Beef consumption went through peaks and valleys. Peaks occurred at less than 1 trip and 3 trips. Poultry consumption increased continuously from less than 1 trip through 4-and-over trips.

Residence Ownership

This household survey showed that renters and owners of the place of residence were almost equally divided (Table 14). Home ownership tends to indicate a permanent resident and was so reflected in higher household meat expenditures and household and per capita

Table 14.
Effect of Residence Ownership on Total Red Meat, Fish, and Poultry Expenditures and Total Annual Wild Game Consumption

Residence Ownership	Number of Households	Average Weekly Household Meat Expenditures	Per Capita Weekly Meat Expenditures	Average Annual Household Game Consumption	Per Capita Annual Game Consumption
	% of Total	dollars		pounds	
Rent home	46	12.33	4.53	45.1	13.4
Own home	54	15.20	4.34	76.0	18.9

wild game consumption. Renters tended to have larger per capita meat expenditures, probably due to smaller household size.

Actual pork consumption was the same for both households renting or owning their place of residence. This was the only type of red meat, fish or poultry for which no difference was indicated. (Table 33 in Appendix B). For all other categories, home owners had higher household consumption than renters. (The difference was small for fish consumption).

Religion

Catholic households, 16 percent of the total in the survey, had the largest household meat expenditures as well as per household and per capita wild game consumption (Table 15). Protestant households, 68 percent of the sample, were second in these same meat expenditures and wild game categories. The difference seemed minimal.

All other religious or non-religious preferences were included in the "other" group. This category, 15 percent of the sample, had only a slightly higher per capita meat expenditure level than either Catholics or Protestants. However, the "other" group had lower household meat expenditures as well as per household and per capita wild game consumption. The "other" group consumed slightly less beef and more poultry. The Catholic households had slightly higher pork and fish consumption. Detailed weekly consumption data can be found in Table 34 of Appendix B.

Table 15.
Effect of Religion of Head of Household on Total Red Meat, Fish and Poultry Expenditures and Total Annual Wild Game Consumption

Religion	Number of Households	Average Weekly Household Meat Expenditures	Per Capita Weekly Meat Expenditures	Average Annual Household Game Consumption	Per Capita Annual Game Consumption
	% of Total	dollars		pounds	
Catholic	16	14.87	4.77	77.8	18.6
Protestant	68	13.89	4.26	64.5	17.1
Other	15	12.50	4.79	32.8	11.0

Race

The sample of 402 Anchorage households was 91 percent white (Table 16). The only category in which the white group had the highest value was household meat expenditures and this was not markedly larger than the native category.

Table 16.
Effect of Race of Head of Household on Total Red Meat, Fish and Poultry Expenditures and Total Annual Wild Game Consumption

Race	Number of Households	Average Weekly Household Meat Expenditures	Per Capita Weekly Meat Expenditures	Average Annual Household Game Consumption	Per Capita Annual Game Consumption
	% of Total	dollars		pounds	
White	91	13.92	4.42	62.9	16.9
Negro	4	11.95	4.03	0.0	0.0
Native	4	13.80	4.56	103.9	23.2
Other	1	12.93	5.11	0.0	0.0

The highest per capita meat expenditures were found in the "other" category (races other than white, Negro or native). The native group consumed by far the largest quantity of wild game, both per household and per capita. Negro and the "other" category did not consume any wild game.

A detailed breakdown of quantities consumed (Table 35 in Appendix B) indicates that higher consumption of beef occurred in the white, native and "other" households. Negro households tended to eat more pork, but the difference between races in pork consumption was not large. Fish consumption was largest in the "other" category and smallest for Negro households. The "other" category had the lowest poultry consumption level.

MULTIPLE REGRESSION ANALYSIS

In the previous section, the influence of individual socio-economic characteristics on consumption patterns was investigated. Now, interest centers on using a statistical technique called "multiple regression" [3]. This research tool allows for the simultaneous estimation of quantitative relationships among specified variables. The intent of this section is to estimate the influence of independent variables on a designated dependent variable. The independent variables will be defined for each equation and will include socio-economic variables as well as certain consumption variables. The dependent variable will be either meat expenditures or an individual consumption variable. In each equation the independent variables will be ranked using R^2 (coefficient of mutiple determination). R^2 is used to measure the amount of variation in the dependent variable that is explained by the independent variables. The variables are defined as follows:

X_1 = Household Size

X_2 = Log of Household Income[9]

X_3 = Years in Alaska

X_4 = Number of Trips to Food Store Per Week

X_5 = Age of the Head of the Household

X_6 = Education of the Head of the Household

X_7 = Annual Household Wild Game Consumption

X_8 = Weekly Household Meat Expenditures

X_9 = Weekly Household Beef Consumption

X_{10} = Weekly Household Pork Consumption

X_{11} = Weekly Household Fish Consumption

X_{12} = Weekly Household Poultry Consumption

X_{13} = Weekly Household Lamb Consumption

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[9] Household income was incorporated into the analysis in logarithmic form. This tended to increase the explanatory power of the regression equations.

Household Meat Expenditures[10]

$$X_8 = 6.53 + \underset{(.26)}{1.84X_1}{}^{**} + \underset{(.72)}{2.65X_2}{}^{**} + \underset{(.04)}{0.01X_3} + \underset{(.26)}{0.68X_4}{}^{*} + \underset{(.04)}{0.02X_5} - \underset{(.18)}{0.58X_6} - \underset{(.003)}{0.01X_7} \qquad (1)$$

$$R^2 = .256$$

Variables Entered	R^2	Increase in R^2
X_1	.149	.149
X_2	.176	.027
X_7	.207	.031
X_6	.239	.032
X_4	.255	.016
X_5	.256	.001
X_3	.256	.000

In Equation 1, the dependent variable was household meat expenditures. Two observations are apparent: (1) five independent variables had major influence on meat expenditures, and (2) nearly 75 percent of the variation was not explained by the regression. Of the five significant independent variables in this equation, three were positive and two were negative. Household size (X_1), household income (X_2), and number of trips to the food store (X_4), positively influenced meat expenditures (e.g., an increase in household size, all other independent variables held constant, increased household meat expenditures). The remaining two significant variables, head's education[11] (X_6), and annual wild game consumption (X_7), were determined to be inversely correlated with meat expenditures. Since increased educational level may be associated with sedentary employment, reduced meat expenditure may be a function of increased concern with diet. The negative relationship observed between annual wild game consumption and meat expenditures indicates a substitution of the former for the latter.

The multiple regression analysis with meat expenditures as the dependent variable had an R^2 of only 25.6 percent. The independent variables were entered into the stepwise regression program in the pattern given below equation 1. Over one-half of the equation R^2 value was attributable to household size (X_1). Variables which contributed in a lesser fashion were head's education (X_6), annual wild game consumption (X_7), household income (X_2), and number of trips to food store (X_4). Age of household head (X_5) and number of years living in Alaska (X_3) contributed very little to the explanation of variability for household meat expenditures in Anchorage.

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[10] Level of significance for each regression coefficient in Equations 1 through 5 was indicated as follows:
*for significance at the 5% level
**for significance at the 1% level
The value directly below each regression coefficient is its standard error.

[11] In the regression analysis, education of head of household and age of head of household were used in place of husband and wife education and age. This was required because a minority of households in Anchorage were headed by either a single male or a single female.

To increase the explanatory nature of the independent variables in this research, a technique called "dummy variables" [4] was added to the regression analysis. This allowed for inclusion into this analysis variables such as occupation, race and religion, which were not quantifiable in the usual sense. However, these added variables did not significantly increase R^2 in any multiple regression equation investigated in this research. On this basis, dummy variable analysis was dropped from consideration. Other research of the type done in this study generally has been unsuccessful in obtaining a high R^2, due primarily to inability to determine all the variables responsible for consumption [5]. Even with a relative low R^2 value, quantification of the socio-economic variables included in this analysis has added to the understanding of red meat, fish, poultry and wild game consumption in Anchorage.

Weekly Household Beef Consumption

$$X_9 = 2.84 + \underset{(.16)}{0.88X_1^{**}} + \underset{(.42)}{0.86X_2^{*}} - \underset{(.02)}{0.01X_3} + \underset{(.16)}{0.28X_4} + \underset{(.02)}{0.01X_5} - \underset{(.10)}{0.19X_6} - \underset{(.002)}{0.006X_7^{**}} \qquad (2)$$

$$+ \underset{(.07)}{0.36X_{10}^{**}} + \underset{(.18)}{0.08X_{11}} - \underset{(.07)}{0.05X_{12}} - \underset{(.47)}{0.65X_{13}} \qquad R^2 = .252$$

Variables Entered	R^2	Increase in R^2
X_1	.119	.119
X_{10}	.190	.071
X_7	.219	.029
X_2	.230	.011
X_6	.239	.009
X_4	.245	.006
X_{13}	.250	.005
X_{12}	.251	.001
X_{11}	.252	.001
X_3	.252	.000
X_5	.252	.000

The significant independent variables which were positively related to pounds of beef consumed per week by the household (Equation 2) were household size (X_1), household income (X_2) and weekly household pork consumption (X_{10}). Annual game consumption (X_7) was the only significant independent variable having a negative sign.

The ranking of the independent variables by R^2 in descending order was as follows: household size (X_1), weekly household pork consumption (X_{10}), annual game consumption (X_7), and household income (X_2) The remaining variables had little to contribute in explaining the variability of weekly beef consumption.

An important facet of beef consumption was its relationship with annual wild game consumption. The negative sign in front of X_7 (wild game consumption) indicated an inverse relationship with beef consumption. Also, wild game consumption ranked third in explaining the variation in beef consumption. Therefore, beef consumption and wild game consumption in Anchorage tended to be substitutes for one another.

Weekly Household Pork Consumption

$$X_{10} = 4.37 + \underset{(.11)}{0.22X_1^{*}} + \underset{(.27)}{0.02X_2} + \underset{(.016)}{0.006X_3} + \underset{(.11)}{0.09X_4} - \underset{(.01)}{0.01X_5} - \underset{(.07)}{0.22X_6^{**}} \tag{3}$$

$$- \underset{(.001)}{0.0005X_7} + \underset{(.04)}{0.17X_9^{**}} + \underset{(.12)}{0.18X_{11}} + \underset{(.05)}{0.06X_{12}} + \underset{(.32)}{0.11X_{13}}$$

$R^2 = .172$

Variables Entered	R^2	Increase in R^2
X_9	.115	.115
X_6	.140	.025
X_1	.159	.019
X_{11}	.163	.004
X_4	.166	.003
X_5	.167	.001
X_3	.168	.000
X_7	.168	.000
X_{13}	.168	.000
X_2	.169	.001
X_{12}	.172	.003

Pork consumption (Equation 3) was not significantly influenced by household income (X_2). This is clearly variant to the situations when meat expenditures and beef consumption were dependent variables (Equations 1 and 2, respectively). One conclusion which could be drawn is that pork consumption was less responsive than beef consumption to any change in household income.

Household beef consumption (X_9) had the most influence in explaining the variability of pork consumption. This follows from Equation 2, which also indicated a strong positive relationship between beef and pork. This was not an altogether surprising result. Families which tended to eat beef also tended to eat pork.

Two other observations can be made concerning pork consumption. A strong negative relationship was exhibited between education of household head and pork consumption. Finally, household substitution of wild game for pork was not indicated in Equation 3.

Weekly Household Fish Consumption

$$\begin{aligned} X_{11} = -0.86 &+ \underset{(.05)}{0.10X_1^{*}} + \underset{(.13)}{0.15X_2} + \underset{(.007)}{0.005X_3} + \underset{(.05)}{0.04X_4} \\ &+ \underset{(.007)}{0.008X_5} + \underset{(.03)}{0.03X_6} + \underset{(.0005)}{0.002X_7^{**}} + \underset{(.017)}{0.007X_9} \\ &+ \underset{(.024)}{0.035X_{10}} - \underset{(.021)}{0.009X_{12}} - \underset{(.14)}{0.01X_{13}} \end{aligned} \qquad (4)$$

$R^2 = .106$

Variables Entered	R^2	Increase in R^2
X_7	.048	.048
X_1	.076	.028
X_2	.086	.010
X_{10}	.092	.006
X_5	.098	.006
X_6	.101	.003
X_4	.103	.002
X_3	.104	.001
X_9	.105	.001
X_{12}	.106	.001
X_{13}	.106	.000

The only two significant independent variables in Equation 4 were annual wild game consumption (X_7) and household size (X_1). The interesting aspect of weekly fish consumption (including sport fish) was the positive sign in front of the variable annual wild game consumption (X_7). As the consumption of wild game increased within a household, there was a tendency for a corresponding increase in fish consumption. This indicates that the pattern of substitution of wild game for meat expenditures (Equation 1) and for beef consumption (Equation 2) was not followed for fish consumption. A complementary relationship between wild game and fish consumption was observed.

Weekly Household Poultry Consumption

$$X_{12} = -0.29 + \underset{(.13)}{0.42X_1^{**}} + \underset{(.33)}{0.50X_2} + \underset{(.019)}{0.032X_3} + \underset{(.12)}{0.28X_4^{*}} \qquad (5)$$

$$- \underset{(.017)}{0.002X_5} - \underset{(.08)}{0.06X_6} - \underset{(.001)}{0.0009X_7} - \underset{(.04)}{0.03X_9} + \underset{(.06)}{0.08X_{10}}$$

$$- \underset{(.15)}{0.07X_{11}} - \underset{(.37)}{0.03X_{13}}$$

$R^2 = .096$

Variables Entered	R^2	Increase in R^2
X_1	.051	.051
X_4	.071	.020
X_3	.083	.012
X_2	.088	.005
X_{10}	.092	.004
X_7	.093	.001
X_9	.094	.001
X_6	.095	.001
X_{11}	.096	.001
X_5	.096	.000
X_{13}	.096	.000

Poultry consumption was influenced significantly by only two of the independent variables included in this research (Equation 5). These positively related variables were household size (X_1) and number of trips to the store (X_4). The remaining variables contributed minimally to the explanatory power of this equation.

The relatively inexpensive nature of poultry compared with red meat, and its wide acceptance, would tend to support the results of this regression analysis; that is, as household size increased, there was a tendency to consume more poultry. The significance of the number of trips to the store indicated that the more opportunity the consumer had to purchase poultry the higher the consumption.

POTENTIAL IMPACT FOR ALASKA RED MEAT AND POULTRY PRODUCTS

In the course of each household interview, the enumerator asked (1) whether the household **had ever** purchased Alaska-produced red meat and poultry products, and (2) would it **prefer** to purchase these products. Table 17 indicates that only one-third of the sample could remember ever consuming an Alaska-produced red meat or poultry product.

Table 17.
Consumer Acceptance of Alaska-Produced Red Meat and Poultry

Response	Ever Purchased Alaska Red Meat or Poultry (%)	Would Prefer to Purchase Alaska Red Meat or Poultry (%)
Yes	37	61
No	54	20
No Answer	8	19

As to the second question, nearly two-thirds of the sample said they would prefer to purchase Alaska-produced products. Only 20 percent of the sample said they would not purchase the products if available.

The concern with most of the consumers who responded positively to the "prefer Alaska products" question was that the product be of similar quality and price to present imported meat. "Similar" does not imply "the same," however. As far as meat grading is concerned, one-half of the sample selected USDA "good" grade beef from pictures (Table 18), while all major chain food stores in Anchorage sell either USDA "choice" or "prime" graded meats.

Table 18.
Consumer Preferences for Choice, Good, and Commercial Beef Grades[a,b]

Prefer Choice Grade (%)	Prefer Good Grade (%)	Prefer Commercial Grade (%)
21	48	27

[a] Each respondent in this household study was shown three unlabeled pictures of the same cut of beefsteak. The three pictures were of USDA choice, good and commercial graded porterhouse steaks, respectively.

[b] Alaskan consumers were found to be similar in tastes to people in other regions of the U.S. Household studies in Wyoming [7] and Montana [2] found similar preferences for USDA good over USDA choice.

In food retailing in the United States, USDA choice grade beef has connotated a "quality" image for many years. Major Anchorage retail food markets have been following this pattern. The Anchorage retail market is not necessarily closed to USDA good grade meat. There are several small food stores in Anchorage which handle this grade of beef.

Beef from Alaska's farms and ranches, if similar in quality and price to USDA good graded beef produced in the lower 48 states, should be marketable in Anchorage. One small retail food outlet currently sells Alaska-produced beef when quantities are available. Probably, given the response in Tables 17 and 18, if larger quantities of locally produced beef were introduced into the Anchorage market, consumers would respond favorably.

In 1971, production of Alaskan beef on a dressweight basis was only 2.1 pounds per capita annually [1, P. 28]. Consumption of beef in Anchorage was estimated to be 109.8 pounds per capita; therefore, the current impact of Alaska-produced beef on the Anchorage market is minimal.

Alaskan producers would seem to have major market-penetration potential as far as manufactured beef is concerned. Nearly 80 percent of the Anchorage households surveyed (Table 2) consumed some hamburger in the seven days prior to the personal interview. The Anchorage market should be accessible not only to Kodiak ranchers marketing their older cattle as manufactured beef, but also for cattle produced on the Aleutians which could be slaughtered locally, frozen and shipped to Anchorage. Again, a major limiting factor is low production of Alaska beef of any type.

Approximately two-thirds of the households (Table 2) consumed some bacon in the seven days previous to the personal interview. Fewer households consumed pork chops, pork sausage, and pork roasts. The pork industry in Alaska has been expanding in recent years with increased use of confinement feeding. Considerable expansion is still possible because Alaska pork production amounts to only one-half pound per capita annually [1, P. 28]. However, this household survey suggested that pork is less desirable than beef from the consumer's viewpoint. Pork consumption, in contrast to beef consumption, was not responsive to changes in household income. To summarize the pork market in Anchorage, there is room for expansion, but growth may be more limited than for beef because of present consumer attitudes.

Lamb and mutton consumption in Anchorage was estimated at 1.1 pounds per capita. Production within the state was approximately 0.1 pounds per capita [1, P. 29] for the year 1971. Only 1 percent or 4 households reported consumption of lamb chops during the survey (Table 2). This study indicated that Anchorage was a small lamb and mutton market. However, state production to supply this market is judged to be extremely low, thus expansion opportunities exist.

Poultry is a major item in the diet of Anchorage households. In this survey, both chicken and turkey were included in the poultry category, with the survey undertaken in the fall of the year.[12] Annual poultry consumption in Anchorage was estimated to be 37.2 pounds per capita, which is much lower than the national average of 50.1 pounds per capita. Even so, only 0.2 pounds [1, P. 32] of poultry per capita were produced in Alaska in 1971. The important issue is "can Alaska producers economically enter this market?" Further study is needed here.

A remaining red meat to be discussed is reindeer. With only one out of 402 households consuming reindeer in the seven days preceding the personal interview, the impact of reindeer on the Anchorage market seems minimal. Only one-third of the households consumed any reindeer in 1971. Part of the reason for low consumption was limited distribution. Reindeer meat was available on order from only one supplier. Reindeer would appear to be somewhat of an exotic meat in Anchorage, with Alaska the only state in the U.S. that produces reindeer commercially.

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[12] Poultry consumption, especially turkey, tends to be higher during the late fall of each year.

LITERATURE CITED

1. Alaska Crop and Livestock Reporting Service. 1972. *Alaska Agriculture*, Palmer, Alaska.

2. Clow, B. 1958. *Meet Your Meats*. Montana Agricultural Experiment Station Bulletin 541.

3. Ezekiel, M. and K. Fox. 1959. *Methods of Correlation and Regression Analysis*. Third edition. New York: Wiley and Sons.

4. Johnston, J. 1963. *Econometric Methods*. New York: McGraw-Hill.

5. McDonald, R. 1966. *Influence of Selected Socio-Economic Factors on Red Meat Consumption Patterns in the Northeast Region*. Maryland Agricultural Experiment Station Bulletin 477.

6. Malone, J. and W. Hughes. 1968. *Some Socio-Economic Factors Affecting Household Expenditures for Meat, Poultry and Fish at the Retail Level*. Nevada Agricultural Experiment Station Bulletin B19.

7. Stevens, I., F. Sargent, E. Thiessen, C. Schoonover, and I. Payne. 1956. *Beef...Consumer Use and Preferences*. Wyoming Agricultural Experiment Station Bulletin 340.

8. U.S. Department of Agriculture. 1972. *National Food Situation*. Economic Research Service. No. N7S-140.

APPENDIX A

Characteristics of Households in Survey

Tables 19 — 23

Table 19.
Relationship Between Household Size and Income Level for All Households Surveyed

Household Income (Dollars)	Household Size (Members) 1		2		3		4		5		6		7 - over		All Households	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0-5,999	7	24.1	10	10.2	14	14.3	4	5.0	2	3.9	0	0.0	1	4.4	38	9.4
6,000-11,999	14	48.3	21	21.4	30	30.6	13	16.2	3	5.9	1	4.4	2	8.7	84	20.9
12,000-17,999	1	3.5	22	22.5	23	23.5	24	30.0	14	27.5	9	39.1	5	21.7	98	24.4
18,000-23,999	5	17.2	17	17.3	12	12.2	17	21.3	9	17.6	7	30.4	6	26.1	73	18.2
24,000-over	0	0.0	13	13.3	7	7.2	12	15.0	11	21.6	5	21.7	7	30.4	55	13.7
Unknown	2	6.9	15	15.3	12	12.2	10	12.5	12	23.5	1	4.4	2	8.7	54	13.4
Total	29	100.0	98	100.0	98	100.0	80	100.0	51	100.0	23	100.0	23	100.0	402	100.0

Table 20.
Relationship Between Occupation of Head of Household and Income Level for All Households Surveyed

Household Income (Dollars)	Occupation of Head									
	White Collar		Blue Collar		Military		Other		Unknown	
	No.	%	No.	%	No.	%	No.	%	No.	%
0-5,999	7	4.5	8	5.2	13	20.3	8	36.4	2	—
6,000-11,999	24	15.5	30	19.5	23	35.9	7	31.8	0	—
12,000-17,999	33	21.3	48	31.2	14	21.9	2	9.1	1	—
18,000-23,999	37	23.9	32	20.8	4	6.3	0	0.0	0	—
24,000-over	36	23.2	17	11.0	0	0.0	2	9.1	0	—
Unknown	18	11.6	19	12.3	10	15.6	3	13.6	4	—
Total	155	100.0	154	100.0	64	100.0	22	100.0	7	—

Table 21.

Relationship Between Education of Husband and Income Level for All Households Surveyed

Household Income (Dollars)	Education of Husband[a] (Years) 1-6		7-12		13-16		over 16		Unknown	
	No.	%	No.	%	No.	%	No.	%	No.	%
0-5,999	1	25.0	16	7.3	8	7.5	0	0.0	13	—
6,000-11,999	0	0.0	48	21.8	18	17.0	2	10.0	16	—
12,000-17,999	0	0.0	63	28.6	25	23.6	5	25.0	5	—
18,000-23,999	1	25.0	43	19.5	20	18.9	2	10.0	7	—
24,000-over	1	25.0	25	11.4	19	17.9	9	45.0	1	—
Unknown	1	25.0	25	11.4	16	15.1	2	10.0	10	—
Total	4	100.0	220	100.0	106	100.0	20	100.0	52	—

[a] Includes households headed by a single adult male

Table 22.
Relationship Between Education of Wife and Income Level for All Households Surveyed

Household Income (Dollars)	Education of Wife[a] (Years) 1 - 6		7 - 12		13 - 16		over 16		Unknown	
	No.	%	No.	%	No.	%	No.	%	No.	%
0-5,999	0	0.0	28	10.4	4	4.0	1	12.5	5	—
6,000-11,999	2	40.0	58	21.5	18	18.2	0	0.0	6	—
12,000-17,999	1	20.0	70	25.9	26	26.3	0	0.0	1	—
18,000-23,999	0	0.0	49	18.2	17	17.2	2	25.0	5	—
24,000-over	0	0.0	26	9.6	23	23.2	4	50.0	2	—
Unknown	2	40.0	39	14.4	11	11.1	1	12.5	1	—
Total	5	100.0	270	100.0	99	100.0	8	100.0	20	—

[a] Includes households headed by a single adult female

Table 23.
Relationship Between Household Size and Occupation of Head of Household for All Households Surveyed

Occupation of Head	Household Size (Members)													
	1		2		3		4		5		6		7 - over	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
White Collar	17	58.7	35	35.7	34	34.7	29	36.2	20	39.2	8	34.8	12	52.2
Blue Collar	5	17.2	38	38.8	30	30.6	36	45.0	21	41.2	14	60.9	10	43.5
Military	0	0.0	20	20.4	27	27.6	9	11.3	6	11.8	1	4.3	1	4.3
Other	5	17.2	4	4.1	7	7.1	4	5.0	2	3.9	0	0.0	0	0.0
Unknown	2	6.9	1	1.0	0	0.0	2	2.5	2	3.9	0	0.0	0	0.0
Total	29	100.0	98	100.0	98	100.0	80	100.0	51	100.0	23	100.0	23	100.0

APPENDIX B

Additional Red Meat, Fish and Poultry Consumption Data

Tables 24 — 35

Table 24.
Effect of Household Income on Weekly Beef, Pork, Fish and Poultry Consumption

Household Income	Number of Households	Average Weekly Household Beef Consumption	Average Weekly Household Pork Consumption	Average Weekly Household Fish Consumption	Average Weekly Household Poultry Consumption
dollars	% of total	pounds			
0-5,999	10	6.7	3.4	0.6	1.8
6,000-11,999	21	5.6	3.4	0.8	1.7
12,000-17,999	24	8.2	3.6	1.3	3.0
18,000-23,999	18	7.9	3.6	1.0	3.1
24,000-over	14	8.7	4.1	1.3	3.2
Unknown	13	7.4	3.5	0.9	2.0

Table 25.
Effect of Household Size on Weekly Beef, Pork, Fish and Poultry Consumption

Household Size	Number of Households	Average Weekly Household Beef Consumption	Average Weekly Household Pork Consumption	Average Weekly Household Fish Consumption	Average Weekly Household Poultry Consumption
	% of total	pounds			
1	7	2.8	1.6	0.7	1.2
2	24	6.2	3.1	0.9	1.8
3	24	7.6	3.6	0.8	2.0
4	20	7.9	4.0	1.1	3.3
5	13	8.6	3.9	1.1	3.0
6	6	10.3	5.0	1.8	3.5
7-over	6	11.0	5.3	1.7	4.4

Table 26.
Effect of Occupation of Head of Household on Weekly Beef, Pork, Fish and Poultry Consumption

Occupation	Number of Households	Average Weekly Household Beef Consumption	Average Weekly Household Pork Consumption	Average Weekly Household Fish Consumption	Average Weekly Household Poultry Consumption
	% of total	pounds			
White-collar	39	6.9	3.2	1.1	2.5
Blue-collar	38	8.2	4.0	1.1	3.1
Military	16	7.1	3.9	0.7	1.6
Other	5	7.2	3.1	0.8	1.8
Unknown	2	6.7	3.1	0.3	0.6

Table 27.
Effect of Husband's Education on Weekly Beef, Pork, Fish, and Poultry Consumption

Husband's Education	Number of Households	Average Weekly Household Beef Consumption	Average Weekly Household Pork Consumption	Average Weekly Household Fish Consumption	Average Weekly Household Poultry Consumption
years	% of total	pounds			
1 - 6	1	6.0	7.0	1.0	2.0
7 - 12	49	8.3	4.1	1.0	2.7
13 - 16	33	7.1	3.4	1.0	2.7
Over 16	5	7.1	2.2	1.2	1.7
Unknown	13	5.3	2.7	0.8	1.8

Table 28.
Effect of Wife's Education on Weekly Beef, Pork, Fish and Poultry Consumption

Wife's Education	Number of Households	Average Weekly Household Beef Consumption	Average Weekly Household Pork Consumption	Average Weekly Household Fish Consumption	Average Weekly Household Poultry Consumption
years	% of total	pounds			
1 - 6	1	5.3	2.3	1.7	7.0
7 - 12	57	7.9	4.0	1.0	2.6
13 - 16	35	7.1	3.1	1.0	2.3
over 16	2	3.9	1.9	0.8	2.0
Unknown	5	5.8	3.2	0.8	2.1

Table 29.
Effect of Husband's Age on Weekly Beef, Pork, Fish and Poultry Consumption

Husband's Age	Number of Households	Average Weekly Household Beef Consumption	Average Weekly Household Pork Consumption	Average Weekly Household Fish Consumption	Average Weekly Household Poultry Consumption
years	% of total	pounds			
19-under	1	6.7	3.0	0.7	0.0
20 - 29	26	6.5	3.6	0.8	2.3
30 - 39	24	8.4	3.6	1.1	2.7
40 - 49	15	8.6	4.5	1.4	3.2
50 - 59	15	8.8	4.3	1.1	2.8
60-over	5	5.4	2.4	0.9	2.2
Unknown	14	5.3	2.3	0.8	1.7

Table 30.
Effect of Wife's Age on Weekly Beef, Pork, Fish and Poultry Consumption

Wife's Age	Number of Households	Average Weekly Household Beef Consumption	Average Weekly Household Pork Consumption	Average Weekly Household Fish Consumption	Average Weekly Household Poultry Consumption
years	% of total	pounds			
19 - under	5	5.8	3.8	0.5	0.7
20 - 29	27	7.0	3.6	0.9	2.7
30 - 39	24	8.2	3.6	1.2	2.6
40 - 49	20	8.6	4.4	1.2	3.5
50 - 59	12	6.8	2.9	1.0	1.8
60 - over	5	5.3	2.4	0.8	1.6
Unknown	7	6.4	3.3	0.6	1.9

Table 31.
Effect of Years of Living in Alaska by Head of Household on Weekly Beef, Pork, Fish and Poultry Consumption

Number of Years in Alaska	Number of Households	Average Weekly Household Beef Consumption	Average Weekly Household Pork Consumption	Average Weekly Household Fish Consumption	Average Weekly Household Poultry Consumption
	% of total	pounds			
0 - 1	17	6.6	4.0	0.9	1.4
2 - 3	11	6.0	2.8	0.7	2.0
4 - 5	12	9.5	4.0	0.9	2.5
6 and over	60	7.5	3.6	1.1	2.9

Table 32.
Effect of Number of Trips to Food Store Per Week on Weekly Beef, Fish and Poultry Consumption

Number of Trips to store per week	Number of Households	Average Weekly Household Beef Consumption	Average Weekly Household Pork Consumption	Average Weekly Household Fish Consumption	Average Weekly Household Poultry Consumption
	% of total	pounds			
0[a]	5	5.9	3.9	0.7	1.5
1	30	5.7	3.3	1.0	1.7
2	29	6.5	3.2	1.0	2.7
3	18	8.2	4.0	1.0	2.8
4-over	18	7.7	4.3	1.2	3.7

[a] Household purchased meat, fish and poultry from a food store less often than once per week.

Table 33.
Effect of Residence Ownership on Weekly Beef, Pork, Fish and Poultry Consumption

Residence Ownership	Number of Households	Average Weekly Household Beef Consumption	Average Weekly Household Pork Consumption	Average Weekly Household Fish Consumption	Average Weekly Household Poultry Consumption
	% of total	pounds			
Rent	46	6.7	3.6	0.9	2.0
Own	54	8.0	3.6	1.1	3.0

Table 34.
Effect of Religion of Head of Household on Weekly Beef, Pork, Fish and Poultry Consumption

Religion	Number of Households	Average Weekly Household Beef Consumption	Average Weekly Household Pork Consumption	Average Weekly Household Fish Consumption	Average Weekly Household Poultry Consumption
	% of total			pounds	
Catholic	16	7.5	4.2	1.2	2.3
Protestant	68	7.6	3.5	1.0	2.5
Other	15	6.6	3.4	0.9	2.6

Table 35.
Effect of Race of Head of Household on Weekly Beef, Pork, Fish and Poultry Consumption

Race	Number of Households	Average Weekly Household Beef Consumption	Average Weekly Household Pork Consumption	Average Weekly Household Fish Consumption	Average Weekly Household Poultry Consumption
	% of total	pounds			
White	91	7.5	3.6	1.0	2.5
Negro	4	5.7	4.3	0.3	2.4
Native	4	7.2	3.9	1.3	3.1
Other	1	7.0	3.8	2.0	1.8

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